Title: EFFECT OF CO_2 ENRICHED-AIR BUBBLING ON *Sphaerospermopsis torques-reginae* AND *Microcystis aeruginosa* (CYANOBACTERIA) GROWTH AND BIOMASS ACQUISITION

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Abstract:

Cyanobacteria are photoautotrophs microorganisms which have ecophysiological mechanisms to inorganic carbon concentration, in order to optimize growth and biomass acquisition. At the climate change scenario, associated to atmospheric CO_2 increase, few works have verified the effects of these conditions on cyanobacterial dominance in lakes. Thus, this work aimed to evaluate the growth and biomass acquisition in *Microcystis aeruginosa* NPLJ-4 and *Sphaerospermopsis torques-reginae* ITEP-024 under aeration (CO_2-enriched air bubbling) conditions. Microorganism were cultured (n=3) in ASM-1 medium with/without aeration. Samples were harvested every two days for cyanobacterial growth evaluation, cellular dimensions and pH, conductivity and temperature analysis, thoughout the cultivation. Statistical analyses were performed on program Statistica 7.0. Evaluated species have shown cellular growth differences ($F_{(6,48)}$=18,635; p<0.05), as well as at the specific growth rates ($F_{(3,8)}$= 4,521; p<0.05). *S. torques-reginae* had a best growth under aeration, reaching a great rate (μ=1.03±0.06 dia^{-1}), regarding conditions without aeration (μ=0.54±0.04 dia^{-1}). Althought, *M. aeruginosa* did not show growth differences among both conditions (Tukey; p>0.05). CO_2 input favored by aeration was preponderant not only to a great growth, but great carbon acquisition in *S. torques-reginae,* which had a biomass yeld > 800 μg C L^{-1}, being two-fold major, regarding *M. aeruginosa* (417.82 μg C L^{-1}). At the cultures, in both conditions with/without aeration, respectively, temperature (NPLJ-4= 24.5±1.14 and 25±0.99 °C; ITEP-024= 25±1.35 and 24.7±1.18 °C) and condutivity (NPLJ-4= 430±0.1 and 404±0.2 μS cm^{-1}; ITEP-024= 421±0.1 and 411±0.05 μS cm^{-1}) have not shown vary. However, it was recorded an increase in pH throughout both treatments, with variations 6.7 – 10.25. pH increasing can be related to the photosynthetic process by CO_2 using, as well as to the inorganic nitrogen metabolism, with consequent release of radicals hydroxyl. On this condition, the input of CO_2 in the alkalized system promotes the dissociation in bicarbonate ions, which have been considered a ideal source of inorganic carbon to photosynthesis (investment in growth and biomass) by cyanobacteria; mainly N_2-fixing species.

Key-words: inorganic carbon, photosynthesis, phytoplankton.

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